

PROGRESS REPORT
For
VERSATILE, HIGH PRECISION STEREO
POINT TRANSFER DEVICE

Period Covered: May 1965
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DDR-DUPE

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POINT TRANSFER DEVICE

Alignment, test and debugging have been the work on a Companion Stereo Viewer system this month. The laser point marking system has also seen debugging effort.

OBJECTIVE ASSEMBLY

In an effort to optimize resolution and improve image quality, the left objective assembly went through a complete alignment check. Although several image deteriorating conditions were corrected such as internal reflections from lens and mirror mounts, contrast and resolution did not improve much. Further study for improvement will continue as other adjustments and debugging takes place.

The obstruction noticed in left channel image was removed. A change in 30X - 128X range objective lens baffle location was cause for this.

The [] 10X objective lenses have been installed. STAT
These lenses were made interchangeable with [] 10X Fluotars : STAT
they replace, but small diameter differences still make necessary matching lens to mount to control lens eccentricity. Also, their associated field lenses are slightly different. Because of the smaller numerical aperture offered by the [] objective, the STAT
barrel diameter was reduced allowing more clearance with loop forming slot vacuum holddown mechanism. In addition, imagery off axis is improved because of the reduced lateral chromatic aberration the [] lens offers. STAT

The anti-vignetting filters have been quoted with at least a four (4) week delivery, placing their receipt in July. Their location and mounting will allow filter insertion anytime so that this factor should not delay customer acceptance testing. Filter will be made of glass with an evaporated metal film to serve as the neutral density filter medium on one side and an anti reflective coating on the other.

Much work was done to reduce flare about dot reticle. Alignments, internal reflections and different lens were investigated, but offered little or no improvement. It is now believed that the zoom optics are a major cause of this problem where the dimension of this flare is near the resolution limit of the zoom optics.

EYEPiece ASSEMBLY

The dot reticle tracking has been corrected after the last customer's visit. The longevity of these adjustments is of concern as the holding of ± 4 arc minutes tolerance for the dot centering has proved very difficult. For example, the clearances in the fiber cable rotating hardware and the slightest lash or random motion of moving mirror mounts introduce sufficient image motion in time and with use to make a predictable dot and image location cover a ± 15 arc minute range at present. Perhaps some of the random motion is caused by dirt entering the temporarily uncovered mechanism, or by creep in the adjustment means provided. Efforts are being made to continually correct differences seen.

Upper eyepiece assembly support casting that was damaged recently has pointed out the need of care at angular travel extremes where large forces may be developed. If turns limiting stop should fail by an overload, for example, a moderate torque at handwheel reflects a very large torque of gear box output and will bring overloads and damage to supporting linkage or gear box. Therefore, maintenance of turns limiting stop will be an important safety need with this equipment.

SCANNING DRIVE

During the last month, scanning drive has received much testing of the tracking error at several magnification differences between channels. A method using scales, not photography, is being used so that absolute differences can be measured. The errors seen have ranged from none to 20%, in a few instances a majority of readings under 10% with a goal of near as possible to 5% with adjustments being made. The error, however, has much to do with the precision of the operator setting the zoom magnifier, and at high magnifications interpolating the scales used for measurement.

Drive has performed well during extended periods of use and standby times, being turned on for 12-16 hours daily. There were a few instances where there was no response to joystick deflection, traced to master switch sluggishness. This was corrected by increase in switch drive spring tension.

During the tracking checks drive vibration dampers appear to be working well, allowing useful viewing and positioning during a wide range of magnifications and scanning speeds.

VACUUM FILM HOLDDOWN

Film guides have now been added at the film loop forming slot to prevent film wandering out of front manifold grooves. These guides are thin to cause least amount of interference with holddown mechanism. Some modification of rear holddown was required so that film guide and holddown are independently acting on film.

Much testing has been performed with this latest configuration with approximately 90% of area down at 15 seconds, nearly all film specimen down at 30 seconds. Tests were run with emulsion up and down with nearly the same response from each. For final evaluation we will need new films of 70mm, 5 inch and 9 1/2 inch widths. Please forward at least 250 feet of each.

Platens for the 552 Point Transfer Device have been received with polished macrogrooves which gave very disappointing results. Macrogrooves are slightly improved over those used on the 552A Viewer, but are quite noticeable at low and high magnifications, even with increased diffusion. Apparently, vendor cannot polish grooves as originally discussed.

Recently we had an opportunity to see grooves of quite different crosssection having flat sloped sides. For this arrangement to be nearly "invisible" very heavy diffusion was required cutting down brightness to a useless level. Recalling our past experiments of groove visibility, the groove sides must have a very gentle transition between groove bottom and platen surface to have least possible optical effect. This, however, lets the film block off groove area with lowered air pressure. In short, there appears to be no answer in sight for this problem of groove visibility without some degradation of imagery.

POINT MARKING SYSTEM

Work has continued to improve reliability of laser system. The principal problem being solved is the ability of laser to fire with unwanted random signals from adjacent circuits. The original trigger circuit generated pulses whose waveshape was very near that seen generated by transients picked up in trigger circuit cables requiring very severe attenuation of trigger pulses to reject these spurious signals. The triggering circuit has now been changed to fire laser with a direct current voltage that allows a more effective rejection of induced transients, and at the same time permits more reliable trigger levels to be realized.

Continued use of laser system has also pointed up the fact that the capacitor bank will need replacement or repair periodically as we have experienced breakdown in several capacitors. The laser equipment manufacturer has also discovered this. The capacitor storage bank will be closely observed during the succeeding test work for the need of circuit redesign for reliability improvement.

Work for the Next Reporting Period

1. Complete scanning drive, mechanical and electric modifications.
2. Study and search for various optical and manufacturing techniques that may minimize groove visibility of vacuum film holddown platen.
3. Design, fabricate and install ruggedized vacuum manifold and plumbing changes.
4. Complete optical debugging.
5. Complete system debugging.

Attachments:

1. Customer Review (Meeting of 5/21/65) #552 - CD-126
2. Financial Report

22 June 1965
552 - CD-126
WWB:rf

CUSTOMER REVIEW

Date: 21 May 1965

- 1) Damage to eyepiece support linkage evening before prevented optics to be judged although they were operating with small misalignments.
- 2) Film arranged in tandem set up, saw film work its way out of left front manifold with film traveling towards center. When temporary film guide installed, this problem ceased. Right side did not require film guide.
- 3) Vacuum holddown had a leak on right center rear holddown. Temporary adjustment permitted system to work normally after film guide installed. Bubbles that appeared most stubborn apparently were caused by film misalignment.
- 4) Obstruction noted in left channel in all magnifications at low zoom magnifications. This believed to be a part of the earlier accident with eyepiece assembly.
- 5) Halo around dot reticle noticed, although improvement seen from previous visit.